

DRAFT

**WATER CONSERVATION PLAN
BERNALILLO COUNTY, NEW MEXICO**

Prepared for:

Bernalillo County Water Resources Program

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BERNALILLO COUNTY WATER CONSERVATION PLAN

1. INTRODUCTION

This document presents the Bernalillo County Water Conservation Plan. As an input to the Plan, Bernalillo County (the County) conducted a study of water usage in the County to better understand the dynamics of reaching County water use goals. As additional inputs to the Plan, the County reviewed mandatory and voluntary measures in other parts of the state and country, and had the Bernalillo County Water Conservation Communications Plan (Communications Plan) developed (see Appendix XX for the entire Communications Plan).

1.1 PURPOSE OF THE PLAN

Bernalillo County has developed a Water Conservation Plan in order to be good stewards of a scarce resource that is a limited resource, and thus a limiting factor for the County. Bernalillo County is in the middle of a rapidly growing region, and in order to maintain quality of life and economic activity, a sustainable water supply will be needed. To be good stewards, the County should conserve water in its facilities, model conservative use of water, work closely with all residents, businesses, and water suppliers in unincorporated and incorporated parts of the County to promote conservation, and work with other governmental jurisdictions in the region to effectively manage water resources.

To this end, Bernalillo County has set the following goals:

- Evaluate current water usage
- Evaluate mandatory, voluntary and other conservation measures for Water Conservation Plan
- Determine resource levels for water conservation program
- Determine sources of funding for water conservation program
- Develop priorities
- Set measurement goals and criteria
- Improve baseline information on County water usage – update annually
- Gather information on domestic well permits and domestic well usage on an ongoing basis
- Gradually develop appropriate ordinance(s)

1.2 CONTEXT OF THE PLAN

The County has incorporated and unincorporated areas, which include the City of Albuquerque with 484,286 residents, the unincorporated County, Los Ranchos de Albuquerque, a village of 5,495 residents, and Tijeras, a village of 467 residents. This Plan covers the unincorporated portions of the County, and, Los Ranchos de Albuquerque pursuant to its request. Employment in Bernalillo County (including the incorporated area of Albuquerque) is 31 percent services, followed by 21 percent Federal, with only 72 percent employed in the agricultural sector. The County is 66 percent single family homes, 27 percent multi-family homes, and 7 percent mobile homes. (MRCOG - 2000 Census information)

The Albuquerque/Bernalillo County Water Utility Authority (ABCWUA) serves Bernalillo County and the City of Albuquerque. The ABCWUA was created by the New Mexico State Legislature in 2003 and includes all of the water and waste water system assets of the City. The ABCWUA is governed by a board composed of City Councilors and County Commissioners and is staffed by City of Albuquerque/Utility Authority employees.

Four large utilities serve 55 percent of the population in the unincorporated portions of the County: ABCWUA, New Mexico Utilities, Sandia Peak Utility, and the Entramosa Water and Wastewater Association. Eight percent of the population is served by 41 smaller utilities or systems, and the remaining 37 percent are estimated to use domestic wells (with a very small population served or supplemented by water haulers in the East Mountains). Appendix A includes a map of the utility boundaries.

As part of its water conservation planning process, the County should initiate coordination with the other entities in the region, primarily the ABCWUA, and secondarily the Mid Region Council of Governments (MRCOG) Water Resources Board (WRB)ⁱ. Economic incentives, policy making, and mandatory measures should be coordinated with the ABCWUA and other entities where possible. Given that Bernalillo County is developing a program for the County, they can take a leadership role with other counties in the region.

As signatories to the Middle Rio Grande Regional Water Plan (MRGRWP), created as part of a process mandated by the state, the County agreed to implement measures from the MRGRWP. Through the planning process, a large number of prominent hydrologists and other experts in the Middle Rio Grande region developed a water budget for the region (which includes Tarrant, Bernalillo, Sandoval, and Valencia Counties, and the municipalities contained therein) and concluded that the region is overspending its water budget by approximately 55,000 acre feet per year beyond the renewable amount. (MRGRWP, 2003). In approving the MRGRWP submitted to the Interstate Stream Commission, the Bernalillo County Commission agreed to the following MRGRWP goals that relate to water conservation:

- Conserve water
- Balance growth with renewable supply
- Preserve water for the region's agricultural, cultural and historical values
- Preserve water for economic and urban vitality
- Measure ALL water uses
- Upgrade agricultural conveyance systems
- Convert to low water use plants
- Implement education programs, rainwater harvesting
- Convert to low-flow appliances
- Level all irrigated fields
- Convert to xeriscape (MRGRWP, 2003)

1.3 STUDY AREAS

Bernalillo County commissioned a study on current water use, which divided the unincorporated areas into seven study areas to facilitate a targeted approach based on demographics, water use patterns, and geographic and other factors that might impact conservation. A map with all of the study areas can be found in Appendix B, and Appendix C contains a maps for each of the individual study areas. Mandatory and voluntary measures from successful conservation programs in New Mexico (Albuquerque/ABCWUA, City and County of Santa Fe) and across the country (Texas, Arizona and California) were reviewed for lessons learned, best management practices, and applicability to the County. Based on all that was learned, a Communications Plan was devised, (summarized herein, contained in its entirety in Appendix D) as well as focused outreach for each of the study areas. In addition, a method to measure the effectiveness of the Water Conservation Plan was developed. Finally, steps for implementing the Water Conservation Plan were outlined. The overall strategy and approach for a Water Conservation Plan are described below.

The seven study areas shown on Figure 1, are Paradise Hills, North Albuquerque Acres (NAA)/Sandia Heights, North area of the East Mountains, South area of the East Mountains (dividing line is I-40), North

Valley, South Valley, and South West Mesa. The City of Albuquerque was excluded and served as the boundary for the study areas. For comparison purposes, the average household income for all of Bernalillo County in 1999 was \$38,788. (US Census Bureau) The study areas are profiled below.

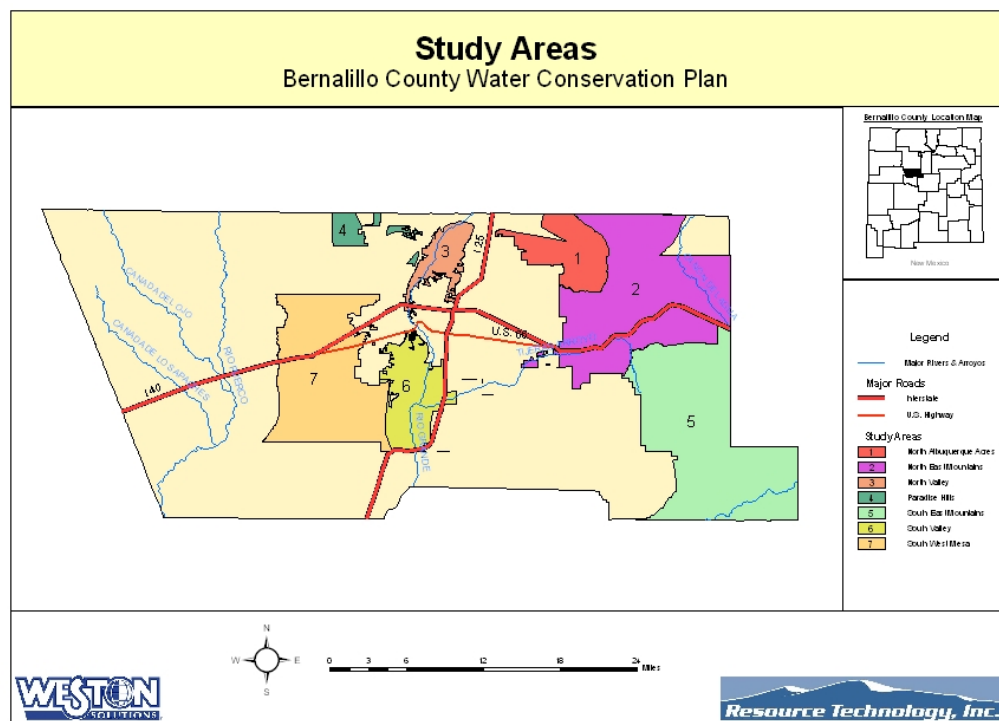


Figure 1. Map of Study areas: 1) NAA/Sandia Heights; 2) North area of the East Mountains; 3) North Valley; 4) Paradise Hills 5) South area of the East Mountains 6) South Valley 7) South West Mesa

1.3.1 Paradise Hills

This area was the earliest urbanized area outside the Albuquerque metropolitan area, now surrounded by the City of Albuquerque. This area is located between Albuquerque and the City of Rio Rancho, with the community of Corrales located to the northeast. Paradise Hills is bounded by Paseo del Norte to the south, the Rio Grande and Alameda to the east, Rio Rancho to the north, and the County line to the west. Homes are in the 35 to 40 year old range, and landscaping reflects an earlier era in which water conservation was not a priority. The average home sale price is \$158,927. Average household size is 2.6 persons. Household income levels range from \$42,000 to \$130,000 per year. Homes are typically in subdivisions. Multi-family units in this area make up about 20 percent of the residential area.

A majority of homes and businesses in Paradise Hills are served by New Mexico Utilities. Sixty percent of the Utility's water is delivered to its 5,787 residential customers. The remainder is directed to community centers, soccer parks, a golf course (roughly 8 percent of the water), shopping, and services. (NM Utilities, 2005)

1.3.2 North Albuquerque Acres/Sandia Heights

NAA/Sandia Heights is the foothills region of the County, ranging from north of Glenwood Hills and east of Tennyson (paralleling and a block west of Tramway). Sandia Heights has primarily older homes, which are, for the most part, pueblo-style with native landscaping. Some covenants in this part of the study area require climate-adapted landscaping. Ornamental water features such as small ponds and fountains are not uncommon in the NAA study area. Most homes in NAA (60 to 70 percent) are newer, with big lots with domestic wells. There are some NAA subdivisions with covenants requiring the use of deciduous trees, shrubs, and bluegrass in their yards. The area includes some scattered retail and little or no industry. The average home price is \$420,000. Household income ranges from \$54,000 to \$130,000. Population in the area is approximately 9,405. The average household size is 2.5 persons.

Sandia Peak Utility serves most of the residents in Sandia Heights (62 percent), with four other smaller utilities serving only 3 percent, ABCWUA providing water to 1 percent, leaving approximately 34 percent using wells. The average gallons per capita per day (GPCD) for utility customers in this sector is 146. Where covenants require lawns, GPCD numbers will be higher. About 8 percent of the residences in this sector are multi-family units.

1.3.3 East Mountains - North

The North section of the East Mountains has a population of 13,050 (73 percent of total for East Mountains). The total number of households is 5,191. Average household size for the North East Mountains is 2.5 persons. Fifty seven percent of the population is served by a utility. The remainder are assumed to be on a domestic well, with a small percentage using water haulers. Most businesses are located along the corridors of NM 14, or old U.S. 66. Businesses are primarily restaurants, convenience stores, tourism facilities, and a wide variety of merchants. The cement plant in Tijeras Canyon (unincorporated Bernalillo County) employs about 100 persons, but no other significant industrial sites are in the study area. San Antonio, Sandia Park, Sedillo, and Carnuel are small communities found in this study area. The proportion of multi-family units is 16 percent, as compared to the County average of 27 percent. The density is 0.3 people per acre. This portion of the East Mountains is wealthier than the South section, as 96 percent of the population has income weighted in the upper three ranges of income, ranging from approximately \$33,000 to \$130,000. Average household size is 2.5. The village of Tijeras is incorporated, and is not included in the study area.

The utility serving the largest number of customers in the area is the Entranosa Water and Wastewater Association with 4,623 customers. In addition, the area is served by 11 other small water utilities with a combined total of 2,899 customers. See Current Water Usage Report (Water Usage Report) in [Appendix A](#) for a list of those utilities.

1.3.4 East Mountains - South

The South Section of the East Mountains has a population of 4,854 (27 percent of total for East Mountains). The total number of households is 1,863. Average household size for the South East Mountains is 2.6 persons. Seventy nine percent of the population is estimated to use domestic wells as their primary source for water. The remaining portion obtain water from one of five small utilities. The South East Mountain study area contains small communities such as Chilili, Juan Tomas, Escobosa, Ponderosa Pine, and Cedro. Lots in this area tend to be smaller than those found in the North section of the East Mountains. Most business are located along the corridors of highway 337 (formerly route 14), or old U.S. 66. Businesses are primarily restaurants, convenience stores, tourism facilities, and a wide variety of merchants. This study area contains no multi-family units. The density is 0.09 people per acre. This portion of the East Mountains is relatively less wealthy than the North section of the East Mountains,

as 92 percent of the population has income weighted in the lower three ranges of income, approximately \$14,000 to \$42,000.

1.3.4.1 East Mountains (combined)

The following information applies to the North and South sections of the East Mountains combined. A majority of residents commute to Albuquerque daily for jobs and shopping. In 1990, the mix of conventional single-family homes versus mobile homes was 80 to 20 percent. About 90 percent of the homes are owned and 10 percent rented.

Some residents rely on or supplement their water supply by paying water haulers to deliver water to their property; however, there is no accurate head count of residents who rely on hauled water. A growing number of residents require supplemental amounts of water to augment their poorly producing wells. Many of the public meeting participants discussed dropping well levels, some as much as a couple of hundred feet and some running dry. Some residents reported having to drill new wells.

1.3.5 North Valley

The North Valley study area has a population of about 20,000 residents living in about 8,000 dwellings with average household size of 2.5 persons. Multi-family housing accounts for about 1,000 or 12 percent of those households. The average water use for all utility customers is 97 GPCD. However, some residents have private wells, and some residents have a well for irrigation and ABCWUA water for indoor use. In addition, some residents use MRGCD ditches as a water supply for irrigation.

The neighborhoods range from developed subdivisions to clusters of widely divergent housing sizes, lot sizes, and water uses. The North Valley could be referred to equally as semi-rural or semi-urban due to the existence of small ranches and livestock that includes horses, buffalo, and other large animals. The average home sale price is \$201,598. North Valley residents' income is distributed across the five income ranges (see Fig. 4 for details), from \$14,000 to \$130,000.

The North Valley has a very strong preservation ethic – preservation of a traditional way of life, preservation of its agricultural heritage, and preservation of its seclusion and ecology. The neighborhood associations are vocal and involved. Many residents can trace their lineage to the earliest settlement of the Valley. Newcomers (mostly affluent due to rising home costs and gentrification) tend to support preservation of the rural ambience and strongly oppose new development.

1.3.6 Village of Los Ranchos de Albuquerque

The Village of Los Ranchos de Albuquerque was formed under the laws of the State of New Mexico on December 29, 1958, and is an incorporated municipality located within the North Valley study area. Surrounded by Albuquerque, the Village covers about 2,500 acres, 123 of which are used for commercial purposes. In recent years, although parts of the Village have changed from open space and agricultural usage to residential development, a very strong sense of community and commitment toward maintaining the area's rural character are Village hallmarks. The Village has tripled in population since 1970. According to 1999 Census Bureau information, 51 percent of residents are employed in management and professional services, 25 percent in sales and office occupations, and 0.6 percent whose primary income is from agriculture. The median household income in 1999 was \$60,500.

1.3.7 South Valley

The South Valley study area has a population of about 46,000 residents living in about 15,000 households with an average household size of 3.0 persons. The South Valley is relatively less well off, as 95 percent of the population have incomes in the lower three ranges, from \$14,000 to \$42,000. There are

approximately 1,100 multi-family housing accounts. The average for utility customers is 109 gallons GPCD. Approximately 9,000 households have water connections from the ABCWUA. Smaller water systems account for about 700 connections, and domestic wells are estimated to provide water for the remainder, about 5,500 homes. Many of these well sites serve more than one family. As in the North Valley, many of the South Valley residents receive MRGCD water for irrigation.

The South Valley is one of the oldest areas of town, and many families trace their lineage to the earliest settlers in the region, whose livelihoods were directly tied to the land and the river. The area was predominantly agricultural until the early 1940s. As such, domestic wells and/or irrigation water provided by the MRGCD have been the principal sources of water for decades. However, agricultural acreage has steadily decreased through the early 1990s as the land has been transformed to residential, commercial, and manufacturing uses. Many South Valley residents consider the area to be rural, with small (often less than five acres) farmsteads devoted to growing crops, raising chickens, or grazing horses and cows. The large immigrant population may require bilingual materials, and might not be as familiar with conservation.

This study area has the largest number of commercial and manufacturing enterprises. Cement plants, brick manufacturers, oil and gas tanks, railroad yards, a massive auto storage center, junk yards, and the ABCWUA's Southside Water Reclamation Plant are located along Second Street on the east side of the river.

1.3.8 South West Mesa

The South West Mesa study area has a population of about 7,000 residents living in about 2,300 households with an average household size of 3.2. The South West Mesa is relatively less well off, as 94 percent of the population have incomes in the lower three ranges, from \$14,000 to \$42,000. There are 16 multi-family housing utility accounts. The average water use for utility customers (all utilities) is about 114 GPCD. Only 159 households have water connections from the ABCWUA. Smaller water systems account for almost 400 connections, and domestic wells are estimated to provide water for 1700 households, many of which serve more than one family.

The South West Mesa provides affordable housing for many first time homebuyers with new subdivisions being created as development heads west. The average home price is \$95,000. This area is seeing explosive growth, particularly on its south side. Landscaping is minimal, in southwest style. Because many homes are new, they contain water conservative fixtures such as faucet aerators and toilets. The characteristics of the south side of the South West Mesa are markedly different from the northern portion of the area where many homes were built decades ago. There are some scattered affluent neighborhoods in this area, and commercial establishments are located along Isleta Boulevard from Bridge Boulevard to Rio Bravo and on Coors Boulevard from I-25 south to Rio Bravo. (See maps in Appendices B and C)

2. AGRICULTURAL USE

The County examined three study areasⁱⁱ that have significant agricultural water use from the MRGCD surface waters: North Valley, South Valley and South West Mesa. Some County residents in all three areas receive allotments from the MRGCDⁱⁱⁱ. MRGCD is a governmental agency that manages and delivers irrigation water, which has undertaken efforts to conserve water (47 percent savings since 1996), including lining ditches, metering diversion and delivery canals, and adding automatic control gates to dams and canals (BBMP, 2005).

A Bureau of Reclamation study (BOR, 1997) demonstrates the amount of acreage for different land uses in the County over time. This study was updated by visual review of 2004 orthophotos to indicate the

amount of irrigated versus fallow agricultural acreage in the North Valley, South Valley, and South West mesa study areas. The number of parcels receiving MRGCD water for irrigation (Strech, 2005) is as follows:

South West Mesa: 31
 South Valley: 1679
 North Valley: 1275
 Total: 2985

Table 1 compares water use patterns for agricultural purposes.

Table 1. Water Use and Irrigated Acres over time

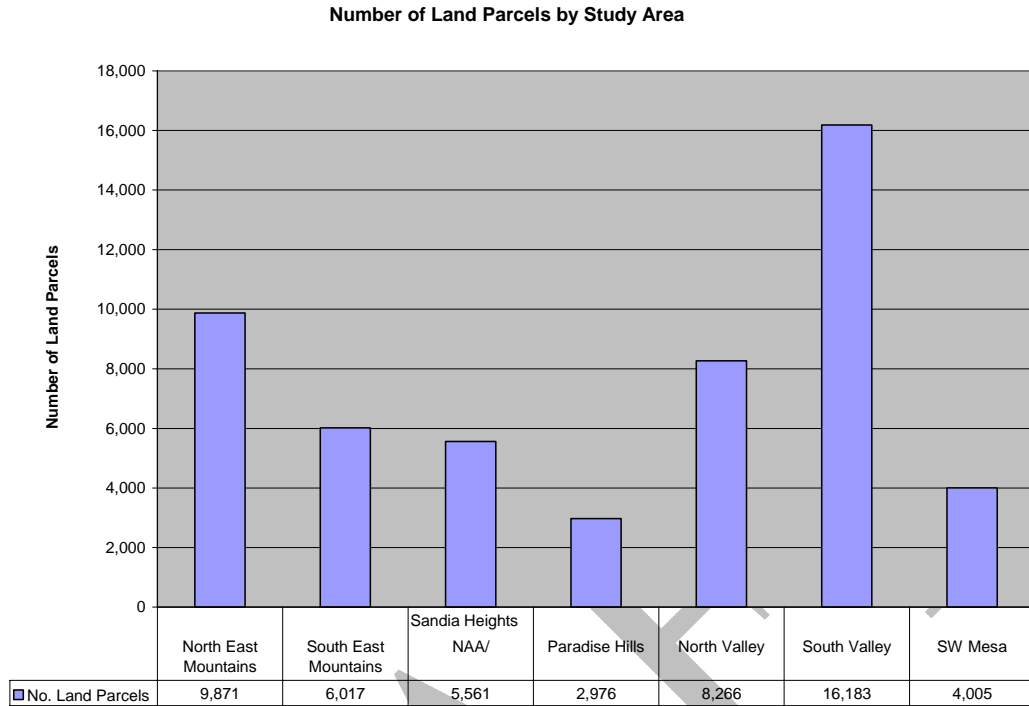
Year	Irrigated Agricultural Acres	Non-Agricultural Acres	Surface Water and Ground Water Consumptive Use for Crops in Bernalillo County
1955	16,071	4,419	21,893
1975	12,667	2,611	20,921
1993	8,489	3,397	20,375
2004	6,562	3,214	--
	% Change	% Change	% Change
1955-1975	-21	-41	-4
1975-1993	-33	30	-3
1993-2004	-23	-5	--
1955-2004	-59	-27	--

Source 1955-1993 data: BOR, 1997

Source 2004 acreage data: Weston, 2005

3. CURRENT WATER USAGE REPORT

Bernalillo County commissioned a study in 2005 to gather current residential water use information for the unincorporated portion of the County. Summary tables from the study are included in Appendix D. The study included gathering information from each of the utilities that serve residents in the area, gathering information on amount of water used by residents on utilities, and estimating numbers of residents who are using domestic wells. The data were then analyzed to calculate gallons per capita per day (GPCD), a common baseline measure for conservation programs across the country. Wherever utility data were available, GPCD was calculated for each study area using utility-supplied information. GPCD was estimated for domestic well users based on extremely limited data from the Office of the State Engineer (OSE) Water Administration Technical Engineering Resource System (WATERS) database. (See Appendix F for further information on the limitations of the data). Overall volume used in the County was estimated based on population projections and current water trends. The bulk of information on current water usage is being incorporated into the County's geographical information system (GIS) system and will be available on the County website (www.bernco.gov). Appendix E is the County Water Usage Report, which includes socioeconomic data and utility information. See figures below for comparative demographic information, references to County include the unincorporated area only.



Total number of land parcels for unincorporated Bernalillo County is 52,879

Figure 2. Number of land parcels by study area

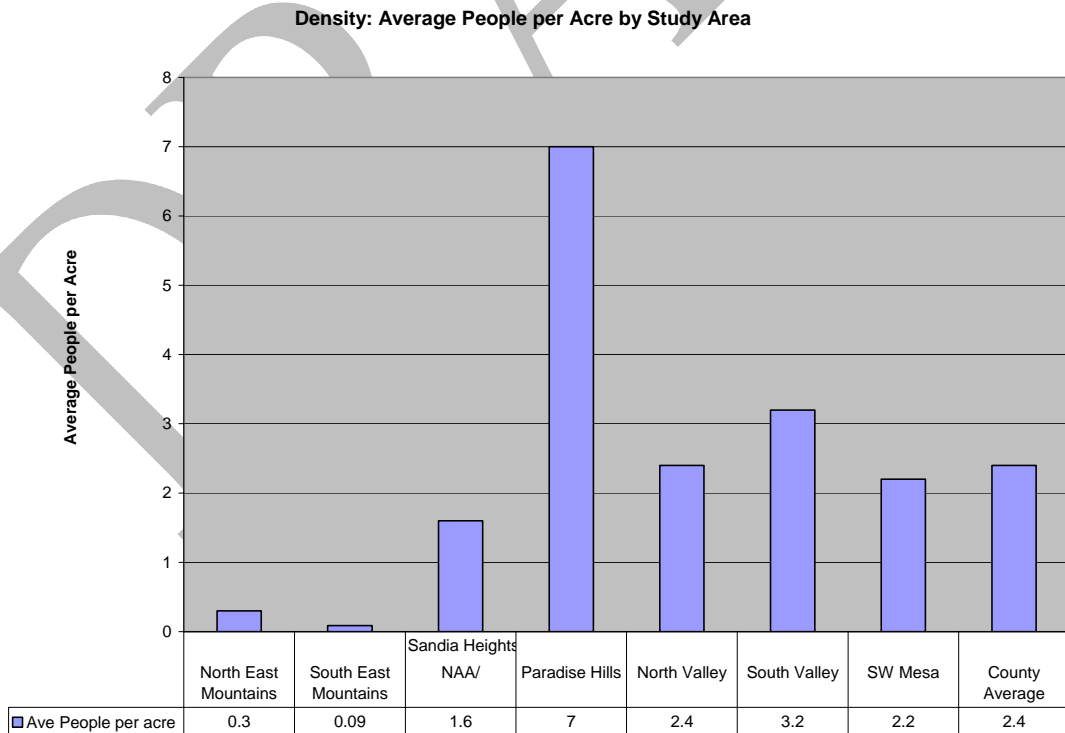


Figure 3. Density by each study area (US Census Bureau)

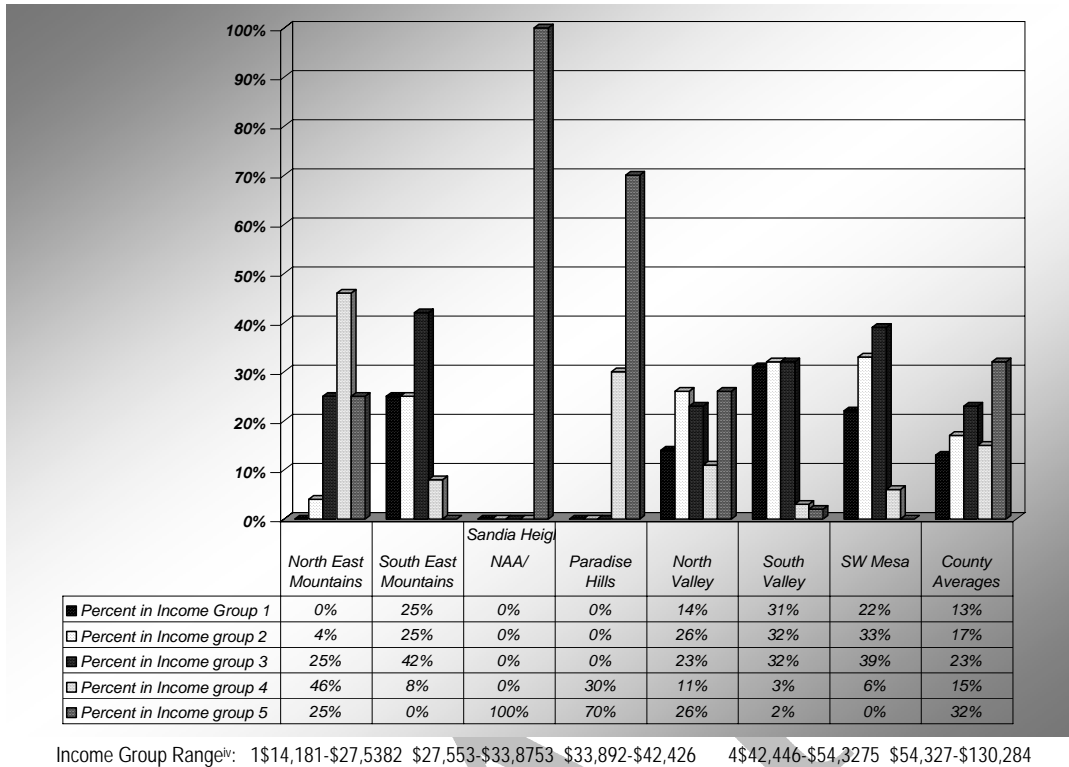


Figure 4. Income Group Range by Study Area (US Census Bureau)

3.1 RESULTS OF THE WATER USAGE REPORT

Based on an analysis of water use patterns, current conservation practices, and awareness, the County can focus its efforts to address the specific needs of the study areas. Generally, 37 percent of County residents are estimated to obtain their water from domestic wells, which is a non-traditional target for water conservation programs. An additional 55 percent obtain their water from a major utility (over 1,000 connections). The remaining 8 percent receive their water from smaller utilities in the County. Using GPCD as a measure (see Appendix E for further information on GPCD calculation), the least conservative study area is NAA/Sandia Heights, followed by Paradise Hills, the South West Mesa, and the South Valley. Based on the volume of water used by utility customers in each study area, supplied by the utilities, the South Valley uses an estimated 45 percent of the water in the County, with 43 percent of the population. Given that this is the largest group and largest user of water, the County should dedicate relatively more resources for educating and influencing that area. The North Valley uses 16 percent of the water, with 19 percent of the population. NAA uses 11 percent of the water, with 9 percent of the population. North East Mountains uses 9 percent, with 12 percent of the population. The South West Mesa's 7 percent of the population uses 8 percent of the water. Paradise Hills uses 6 percent of the water for its 6 percent of the population. The South East Mountains uses 4 percent of the water, while representing 5 percent of the population.

In the shorter term, due to the land availability and proximity to infrastructure, Paradise Hills and the South Valley will likely have the greatest percent increase in population, resulting in the greatest increase in water use. Therefore, issues around land use and development trends should be the focus of the Water Conservation Plan in those two areas.

Paradise Hill is the most dense of all of the study areas at 7 people per acre, followed by the South Valley at 3.2 people per acre, the North Valley at the County average of 2.4 people per acre, and the South West Mesa, at 2.2 people per acre.

Residents in the East Mountains have the highest number of domestic wells, whereas residents in the South West Mesa have the highest proportion of domestic wells among the seven study areas. Education about domestic wells should target all study areas except for Paradise Hills, which has a relatively low number of domestic well permits. The OSE data indicate a maximum of 130 domestic wells permits in Paradise Hills.

4. DATA GAPS

In evaluating current water usage, a number of data gaps were identified. Data from the OSE WATERS database were used, but those data are not reliable for spatial accuracy, consistent entries, or correct information. Information from the County's records was also used to gather data about County water usage, but those data have only been gathered in recent years. For further information on data quality, see Appendix F. Poor data quality, lack of well permit data, lack of accuracy of well permit data, lack of well meter data reported, and the following data gaps have an impact on the data analyzed.

OSE data are inadequate for evaluating domestic well use. The OSE needs further database entries and data quality review before that information can be used for evaluation purposes. Of the OSE-issued domestic wells permits, only an estimated 25 percent are required to report their use, and overall only 2 percent are actually reporting use. New wells are reporting at a higher rate. Bernalillo County should gather baseline data on domestic well use in the County.^v

The history of water levels (feet) and yields (gallons per minute) of wells for community water systems, domestic wells with meters, and small utilities should be gathered. First priority should be on gathering information in the East Mountains due to the fluctuation of water levels in the area.

Bernalillo County should work with community water systems and small utilities in the unincorporated County to improve data gathering. Data gathering for most of these small utilities should be improved in three areas for water conservation potential: accurate measurement of individual use, apparent losses^{vi}, or real losses caused by system leaks or storage overflow.^{vii}

4.1 RECOMMENDATIONS FOR FILLING DATA GAPS

The OSE should gather and make available meter readings from all metered domestic well users, including well shares, and the County could access that data as needed. In addition, the County can build on the data gathered to update the County Water Conservation Plan by annually populating a spreadsheet with usage information (see sample in Appendix G). Bernalillo County can survey community water systems and small utilities for water conservation potential. Bernalillo County should work with community water systems and small utilities in the unincorporated County to improve data gathering on demographics, boundaries (where applicable), leaks, and system information (AWWA website).

4.2 ASSESSMENT OF PUBLIC PERCEPTION

In addition to gathering data on current water usage, the County reviewed recent water-related surveys in the region (see Appendix H for details) and held a series of five meetings throughout the County to assess residents' water conservation practices and perceptions, as well as to elicit suggestions for the County's process in putting together a Water Conservation Plan. A number of common themes ran throughout those meetings, which have been used to help shape the Water Conservation Plan. (See Appendix H for a complete report on the public meetings, and Appendix I for the individual presentations on each of the study areas.)

The following nine **themes** were developed from the County residents who participated in the public meetings (for further information, see Appendix **D**):

- **THEME 1** – “We know water conservation is important.” Most residents are familiar with the importance of water conservation. Therefore, communication resources should be focused on specific methods to conserve water rather than on non-specific conservation messages. This theme demonstrates an overall level of support for a water conservation plan and program for Bernalillo County.
- **THEME 2** – Exploring the “Why.” Therefore, the rationale for conservation, as it impinges on water supply issues, must be reinforced in all future communication activities. This theme is addressed in the Communications Plan and outreach to small utilities.
- **THEME 3** – “We’re already conserving.” Most County residents who participated in the five public meetings report they practice conservation measures^{viii}, but the majority of their activities are low-efficiency practices. High-efficiency activities such as xeriscaping, rain-water harvesting, and low-flow fixtures are implemented by a very low percentage of participants.
- Hence, significant resources should be allocated to providing incentives and communicating “how to” conservation measures, with emphasis on high-efficiency results, such as major landscape adjustments, fixture retrofits, and other ideas. This is addressed in residential and commercial incentives.
- **THEME 4** – “We need more education on conservation issues.” This was a very strong theme throughout all the public meetings that reflects a public willingness to be informed and educated on water issues. This willingness bodes well for an effective communication campaign. Based on this theme, the thrust of the public communication program should be predominantly educational and informational. This theme is addressed in the Communications Plan.
- **THEME 5** – “Don’t mess with my well.” Many well users are independent souls and express resistance to government intervention in how they operate their wells. The approach to well users needs to emphasize that well owners have a hands-on opportunity to ensure their own future water supply with efficient well practices. This theme is primarily addressed in the Communications Plan.
- **THEME 6** – “How can Bernalillo County help?” Although there is some hesitation and indeed suspicion about government intervention in their water use, participants were receptive to a number of potential initiatives that might be undertaken by the County. This theme is addressed in both voluntary and mandatory measures, as well as incentives for new development. Bernalillo County should consider implementing the following steps that residents consider would contribute to improved conservation practices County-wide.
 - Tighten laws authorizing subdivisions
 - Institute grey water system incentives for builders/developers
 - Consider metering wells
 - Consider tiered billing to promote conservation among utility customers
 - Establish incentive and rebate programs, such as water audits and rewards for low water use.
- **THEME 7** – “A diverse universe.” Because there are widely divergent interests, concerns, values, and culture among and between the study areas, communications need to be targeted. This theme is addressed in the Communications Plan.

- **THEME 8 – “Water Quality.”** Communications should include a focus on water quality issues with particular emphasis on the arsenic challenge and its remediation, nitrates, and domestic well protection. This theme is addressed in mandatory measures and the Communications Plan.
- **THEME 9 - “We need to control new development.”** County residents expressed the need to ensure that development occur in a measured, responsible manner. Bernalillo County needs to articulate current development requirements, then engage the public in options for water resource management in development. This theme is addressed in voluntary and mandatory measures. Residents suggested some of the following measures:
 - Stricter ordinances and standards for new developments
 - Control of population growth and new housing
 - Encouragement of low-impact development
 - Zoning reviews to limit new development

5. CONSERVATION MEASURES

Measures to achieve water conservation fall into three categories: (1) program actions, (2) voluntary measures, and (3) mandatory. Program actions refer to measures that can be taken directly by the County to implement or encourage water conservation. Voluntary measures refer to measures, such as education or incentives, to promote water conservation. Mandatory measures are those that are regulatory in nature. These measures can be combined or phased in over time. The range of options varies, depending upon the practices and preferences of the County residents and businesses, as well as the political will of the County leadership. Therefore, a combination of voluntary measures, mandatory measures, and program actions needs to be evaluated by the County. The Implementation Plan in this document covers more fully the range of options.

Program actions by the County are important in taking steps to encourage citizens and businesses to practice conservation by modeling good conservation practices.

Bernalillo County can implement voluntary measures by providing education on how to conserve, and by providing incentives to conserve. One incentive program is to provide rebates to County residents for practices that promote conservation. Incentive programs are by their nature voluntary and reward the participants. Rebates and other incentives are usually more costly for the sponsor than other measures and have far lower participation rates, but they are more readily accepted politically and more popular with the public. Rebate programs do not generally violate the anti-donation clause, because the goal of rebates is to decrease water use, which ultimately benefits the public. In addition, rebates that encourage individuals to conserve may serve as an encouragement to other individuals, thus increasing the amount of water saved and public benefit.

Mandatory measures usually have fines or penalties for nonconformance, are generally easier to administer than rebate programs, and have high participation rates. Mandatory measures are considered to be the most effective at instituting change for conservation, but pose more political, legal, and consumer problems. Bernalillo County can phase in mandatory measures over time, beginning by strengthening existing ordinances and developing new ordinances for the County as appropriate. The County can also work with other entities to encourage state-wide mandatory measures, and work with community water systems and neighboring water utilities to coordinate efforts. The range of mandatory measures that could be considered and phased in over time is outlined more fully in Section 5.3.

Conservation can be encouraged in different ways. The simplest application to minimize impact on County residents is to require conservation measures for new development, so that it is incorporated from

the outset, and to provide incentives for existing homes to conserve. Strategies that target outdoor water use (landscape and irrigation water use) are gaining popularity in conservation programs as the plumbing code changes have slowed the rate of return on programs that target indoor water use. The potential to save water in inefficient irrigation systems, including agricultural use, is significant.^{ix}

5.1 PROGRAM ACTIONS

The County should designate or hire staff to implement the Water Conservation Plan, depending on the budget and range of options that the County chooses to pursue. To direct the water conservation program, the County should set County-wide and household conservation goals and publicize them. In order to incorporate County stakeholders in the water conservation program, and tailor it for maximum benefit, Bernalillo County Water Resources program staff should set up an advisory board for the program implementation and ongoing feedback. The advisory board should be composed of representatives from the specified study areas to cover all constituencies. In addition, the advisory board should coordinate closely with the Water Resources Advisory Council that is advising the ABCWUA, either with members in common, or a designated liaison. An alternative to an advisory board is for County staff to interact with all of the neighborhood associations for the desired community input.

Bernalillo County should act as a role model for water conservation. Some of the areas where the County can lead by example are as follows:

- Implement County Water Conservation Plan for facilities (impacts are outlined in the Water Conservation Plan for Bernalillo County Facilities (Facilities Plan)
- Use County facilities as demonstration sites for climate adapted landscaping
- Implement best management practices (BMPs) for conservation
- Develop water budget for County facilities and parks.

Bernalillo County staff should work with key stakeholders to create incentives for conservation directly for Bernalillo County. Bernalillo County should also work in collaboration with other counties and communities in the region. Two areas where the County could work regionally are as follows:

- Work with other entities for New Mexico Public Regulation Commission (PRC) changes to adopt requirements for conservation rates for utilities regulated by the PRC in New Mexico.
- Work with Middle Rio Grande Water Resources Board (Sandoval, Valencia, Bernalillo Counties and municipalities in the region) for implementation of conservation measures identified in the Middle Rio Grande Regional Water Plan.

5.2 VOLUNTARY MEASURES

This section discusses a variety of potential voluntary measures that could be implemented around the county.

5.2.1 Outreach to small utilities

Bernalillo County's goal of maximizing conservation in unincorporated Bernalillo County will ultimately benefit the residents by protecting helping to protect water resources for the future. To help accomplish this goal, the County should work with community water systems and small utilities to account for system losses, customer leaks, and reduction of those. Bernalillo County can potentially use incentives and education to help them operate more efficiently. In gathering information for the Water Usage Report, many of the smaller utilities were difficult to contact, as oftentimes staff or board members work part-time and/or as volunteers. In addition, many of the community water systems have inefficient distribution systems, which they have no means to repair. Mobile home parks without submetering on individual

mobile homes are often wasteful of water because of the inability to detect leaks or determine sources of waste. Submeters are reported to reduce water use by 20 to 40 percent. (USEPA, 2006.)

Bernalillo County can assist with education in the following areas:

- Assist mobile home parks submeter individual mobile homes^x
- Assist small utilities in performing regular meter testing and repair^{xi}
- Assist small utilities systems in determining the amount of non revenue water
- Provide assistance with grant writing for implementation of conservation measures
- Provide leak detection audits for small utilities
- Provide leak detection audits to small utilities' customers
- Assist small utilities in conducting audits to track spikes and meter readings of zero to determine if reading is correct
- Assist small utilities in tracking non traditional uses, such as fires, flushing and treatment

5.2.2 Incentive Program for Residents

Other water conservation programs around New Mexico and the country were reviewed for lessons learned on incentive programs. There are only a few examples of other counties putting together a water conservation program. Some of the common utility customer incentive programs are normally administered through a billing system and are not easily available to the County. (For details on incentive programs reviewed and lessons learned, see Appendix J.) Economic and incentive options for Bernalillo County must consider the large number of both metered and unmetered wells, shared wells, agricultural use, and the numerous water providers, including mobile home parks, utilities, and community water systems. Aside from the ABCWUA, the largest providers are New Mexico Utilities serving Paradise Hills, Sandia Peak Utilities serving the far Northeast Heights, and Entramosa Water and Wastewater serving the East Mountain area.

As the County develops a Water Conservation Program, it will be efficient to coordinate rebate and incentive programs with the ABCWUA as outlined below (see Recommendations for Economic and Incentive Alternatives). The ABCWUA serves the incorporated areas of the City of Albuquerque, but also has connections in several of the study areas in the unincorporated areas of the County, most notably in the North and South Valley (see Appendix E tables for details). Appendix K provides details on the ABCWUA, goals, how it came into being, and the organizational structure.

The following voluntary measures are recommended for consideration:

5.2.2.1 Capitalize on existing rebates

Publicize availability of existing ABCWUA rebates to eligible County residents (those who have or will have ABCWUA water service, **even outside the City boundaries**). As County residents connect to ABCWUA water service, offer audit and recommend participation in ABCWUA toilet rebate program to eligible County residents (see above).

5.2.2.2 Promote indoor savings with low-flow fixtures, such as toilets and water efficient washing machines

Develop rebate program. For maximum efficiency, this should most likely occur in conjunction with ABCWUA, through an amendment to the existing Joint Powers Agreement, to coordinate rebate program for County residents not already eligible under the ABCWUA service area for toilets, washing machines, and irrigation efficiency improvements. Additionally, the County could negotiate with ABCWUA to allow County residents participating in the Partners in Improving and Protecting the Environment (PIPE) program to apply for a toilet rebate even without water service. A benefit of inclusion of the PIPE program participants is that ABCWUA will limit the amount of additional supply required to supply water for higher flow toilets. Low-flow fixture rebates should be targeted at homes that are older than 1995 and not likely to have been improved.

Toilets

Low-flow toilets are estimated to save on average 10,000 gallons per year in a typical household. The ABCWUA rebate for residential use is \$125 for the first toilet, \$75 for a second toilet, and \$50 for a third one. For businesses and multi-family properties, the rebate is \$75 per toilet. The cost benefit analysis has to consider the useful life of the toilet because while the rebate cost is a one-time expense, the water savings continue for the life of the toilet. Assuming a useful life of 25 years^{xii}, the total savings would be 250,000 gallons for the cost of \$125. A single family home would save at least \$400 in water consumption at current ABCWUA rates. Since rates tend to rise over time, the savings would continue. Table 5 shows typical water gallons savings based on household size and number of toilets.

**Table 5. Single Family Savings for Retrofitting to an Ultra Low Flow Toilet
(Gallons per Household per Day)**

Persons per Household	Toilets per Household ^a															
	1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0	2.1	2.2	2.3	2.4	2.5
2.0	22.8	24.3	25.7	27.1	28.5	29.9	31.3	32.7	34.1	35.5	37.0	38.4	39.8	41.2	42.6	44.0
2.1	23.8	25.4	27.0	28.5	30.0	31.5	33.0	34.5	36.0	37.4	38.9	40.4	41.8	43.3	44.6	45.9
2.2	24.6	26.4	28.0	29.6	31.2	32.8	34.3	35.9	37.4	38.9	40.4	41.9	43.4	44.8	46.1	47.4
2.3	25.3	27.1	28.8	30.5	32.2	33.8	35.4	37.0	38.5	40.0	41.6	43.0	44.5	45.9	47.2	48.4
2.4	25.8	27.7	29.5	31.2	32.9	34.6	36.2	37.8	39.3	40.9	42.4	43.8	45.2	46.6	47.9	49.0
2.5	26.4	28.2	30.0	31.8	33.5	35.2	36.8	38.4	40.0	41.5	42.9	44.4	45.7	47.0	48.2	49.3
2.6	26.8	28.6	30.5	32.3	34.0	35.6	37.3	38.8	40.3	41.8	43.3	44.6	45.9	47.2	48.3	49.3
2.7	27.1	28.9	30.8	32.6	34.3	35.9	37.5	39.0	40.5	41.9	43.3	44.6	45.9	47.0	48.0	48.9
2.8	27.3	29.1	31.0	32.8	34.4	36.0	37.6	39.1	40.5	41.8	43.1	44.4	45.5	46.6	47.5	48.2
2.9	27.5	29.2	31.1	32.8	34.4	36.0	37.4	38.8	40.2	41.5	42.7	43.8	44.8	45.8	46.6	47.2
3.0	27.5	29.3	31.0	32.7	34.2	35.7	37.1	38.4	39.6	40.8	41.9	42.9	43.8	44.6	45.3	45.8

a. Estimates in the table are accurate within ± 5 percent of model estimated water savings.

These calculations are from the California Urban Water Conservation Council (CUWCC) based on extensive studies of low-flow toilet retrofits. If only one toilet were replaced in the 28,000 homes that were built in 1995 or before, using the County-wide average household size of 2.7, the savings projected for Bernalillo County would be 276,962,000 gallons annually for a one-time cost of \$3.5 million.^{xiii}

Another option for toilet replacement is through a special event such as a toilet giveaway. Toilet distribution events create a significant water savings through a short-term intensive effort, and the savings begin immediately. Toilet distribution programs have been successful in other communities. The City of

Santa Fe conducted a distribution program in 2002, giving away about 8,000 toilets.^{xiv} The cost of the programs which included toilet, showerhead, and faucet aerator giveaways averaged, about \$102 per set of water saving devices. The overall projected water savings over the 25-year life of the toilets was about 2 billion gallons of water, and the program cost for every 1000 gallons of water saved was estimated to be about 41 cents. The average estimated savings per toilet/showerhead/faucet aerator set of devices was about 14,600 gallons per year each.

Many communities in southern California have conducted large-scale toilet distributions. The giveaway programs are usually organized as follows: the toilets are distributed from an easily accessible place, such as a high school parking lot during specific hours; availability is on a first-come, first serve basis; residents must show proof of residency; residents are given about two weeks to install the new toilet; and then a second event is held to collect the old toilets, which are then recycled. If the resident does not return the old toilet, their water account is charged for the cost of the new toilet. Although these programs are typically administered or paid for by the water utility serving the area, Bernalillo County could sponsor a distribution directly, providing the toilets to property tax payers only, and billing them for the toilet if the old toilet is not returned.

Water-Efficient Washing Machine

According to the CUWCC, replacing a high-flow washing machine with a water-efficient machine can save almost as much as a low-flow toilet, depending on how efficient the washing machine is, how many loads are done per week, how much water the old washing machine was using, and other related factors. However, water-efficient washing machines are much more expensive than low-flow toilets, so the cost benefit to the consumer may not be as high in terms of water savings, but the energy savings are considerable (up to two-thirds less energy). The cost of the water-efficient washing machine takes into account the incremental costs between the water-efficient washing machine and a comparable machine that is not water efficient, usually in the range of \$400 to \$1000 per machine. While the cost of the washing machine is greater than the cost of the toilet, the County can choose to offer a rebate of any amount. The ABCWUA currently offers a \$100 rebate for a water-efficient washing machine, which is less than the rebate for a toilet.

5.2.2.3 Audits

Water efficiency audits or leak detection audits may be offered free of charge to County residents, probably through coordination with the ABCWUA. Single and multi-family residential audits can save 7,000 to 8,000 gallons per year for a single family or more and if the audit is targeted to families with probable leaks. A targeted program is one like the ABCWUA's program whereby single family audits are focused on customers who likely have a leak based on recent water usage patterns. When a spike is seen in water usage, a letter is sent to the resident notifying them of the spike in usage and suggesting a water audit. Frequently residents assume that the meter was misread or broken, and a leak would have been obvious. In these cases, the customer will request that the water provider correct the error, as opposed to searching for a leak. The audits that are the result of a spike in usage can often result in immediate savings, often in the thousands of gallons per day. In addition to leak repair, audit visits will include other traditional recurring savings elements, such as showerhead and aerator replacement, toilet displacement bags (in lieu of replacing a toilet with a lower water use toilet), and improved irrigation schedules. Single and multi-family residential audits are difficult and costly to administer and have a lower cost benefit ratio than some other measures. An audit requires a scheduled visit to the home, for about 45 minutes to an hour, with the resident present throughout the audit. One staff can complete about five single family audits per day. Audits cost anywhere from \$40 to \$200 each. In Bernalillo County the costs would likely be higher because of the driving distances to County residents, which would increase the time and travel costs. Contracting with local water utilities to provide the audits is an option that

would eliminate some of the problems of long distances, but would be very difficult to establish, monitor, and effectively manage.

The savings for residential water audits include savings from retrofit of high-flow devices with low-flow, and savings from changes in human behavior associated with the audit. The retrofit savings attributable to low-flow showerheads and aerators will continue for the useful life of those devices, but the behavioral changes could wane over time. Therefore, some of the projected savings may decrease. Also some retrofit or changes may be completed over the years as the homeowner or business can afford to make the changes, resulting in increased savings down the line.

5.2.2.4 Domestic wells

Metering encourages water conservation and better monitoring of usage patterns and trends, therefore incentives would benefit the welfare of County residents (USEPA, 2006.). Bernalillo County could offset the cost of the meter by taking responsibility for the annual water quality sampling on an annual basis for the homeowner, and not requiring the homeowner to pay the fee for the well permit. As an additional incentive, the County could pay for the cost of the meter.

5.2.3 Incentives for Outdoor Conservation

Incentives for outdoor conservation include irrigation controllers and other techniques, such as cisterns, gray water systems, or weather sensing irrigation systems. Audits and metering domestic wells are also useful incentives.

5.2.3.1 Landscape Efficiency

Irrigation controllers are electronic or mechanical devices used to control time of day and duration of irrigation, and thus are a potential source of water conservation. The controllers cost approximately \$100 and used **correctly**, save roughly 15 percent of outdoor water use. The cost benefit ratio depends on the site, the size of the irrigated area, the plant mix, and watering schedules. A rebate for irrigation controllers has proven to be popular with customers in the other programs surveyed.

For existing homes, rebates could be given to homeowners for the installation of cisterns, grey water systems, or weather sensing irrigation systems. Rebates could take one of two forms, either a coupon for property tax rebate or decrease, or a check to the resident. These rebates are typically between \$35 and \$75. Savings effectiveness is not well quantified given the relative rarity of these systems. Savings are dependent upon individual habits and the extent of modifications done. For retrofit of existing homes, it is not expected that these systems will offset their cost; however, they are popular with the public.

5.2.4 Incentives for New Development

Incentives for new development include rebates for developers and incentives for metering domestic wells. One option is to provide a rebate to developers for incorporating water conservation measures, either for rainwater harvesting or irrigation efficiency in new development. For example, a lot to be developed would be eligible for a several hundred dollar rebate with the submittal of a water harvesting plan to capture a minimum of 85 percent of the roofed area for used in landscape irrigation. Bernalillo County would have to develop general guidelines for evaluation criteria for water harvesting plans. In addition, a residential development with 2,500 square feet or greater of heated area, would be eligible for a rebate by installing a cistern that is buried, partially buried or housed within an insulated structure. On smaller homes, the installation of a system to capture rain will render a development eligible for a rebate.

Incentives for developments of less than five lots could be implemented for a water conservative site design (i.e., capture of rainwater for on-site landscaping use, if landscaping is planned). Recommend a

range of \$25 to \$250 is reasonable. The program could match the ABCWUA with a \$25 rebate for a rain water harvesting barrel, \$100 for cistern (much more expensive), \$250 for cistern and water-conserving landscape permaculture features, as the latter requires more effort. For homes that are built to completely re-use the water on-site, and treat it, a permit will be required from the County, but that lot would be eligible for a \$750 rebate, as a system to re-use the water on-site would be costly to install.

The Southern Nevada Water Authority just started a program in collaboration with the Home Builders Association to recognize homes, neighborhoods, and builders who build to the Water Smart Home standard, which exceeds the current plumbing code. These homes meet efficiency standards for landscaping, have high-efficiency washing machines, dishwashers, hot water systems, cooling systems, and dual flush toilets. Although there is no financial incentive, the Water Authority publicizes the program and promotes buying the Water Smart Home. KB Homes is the only builder designated as a “Water Smart Builder,” which means they have committed that every new home they build will meet the higher standards.

Incentives for metering domestic wells for new homes could be provided to encourage water conservation and to better monitor usage patterns and trends. Bernalillo County could offset the cost of the meter by taking responsibility for annual water quality sampling, and not requiring the homeowner to pay the fee for the well permit. As an additional incentive, the County could pay for the cost of the meter.

The County could develop a recognition program for residents or businesses that demonstrate good conservation practices, such as xeriscape landscaping. The results could be publicized in the local papers and other venues.

5.2.5 Incentive Program for Agricultural Use

The major difficulty in developing a conservation program for agriculture is that existing state law does not recognize conservation as a beneficial use. Therefore, when agriculture uses water, it is based on a water right, which is a property right. That property right is subject to the OSE determination that the water right is being put to beneficial use. Any water right that has not been put to beneficial use for four years can be subject to forfeiture, and would become part of the waters of New Mexico. Therefore, the concept of “use it or lose it” does not currently support conservation by agriculture.

However, if an agricultural user were willing to conserve, and then use that water right to support processing of a value-added crop, such as processing green chile, that would be a way for agricultural users to conserve without losing a water right. If water conservation or in-stream flow were recognized as beneficial use under state law, then the County could potentially support more efficient use of water by supporting adding value to existing crops through the existing small business incubator in the South Valley (this would require some pooling of water rights to support the water use for processing in the commercial kitchen that is part of the small business incubator). Another option is for the County to provide incentives for conversion to more water-efficient and profitable crops, such as lavender. Other options for incentivizing conservation in agriculture is to allow a property tax rebate for conservation measures taken, such as lining ditches or laser leveling of fields. Bernalillo County could also support on-farm efficiency in conjunction with the MRGCD, whereby MRGCD ratepayers would decrease the amount of irrigation water used, and lease that unused water, if vested water rights are quantified and protected (BBMP, 2005). Agricultural users over a certain size would have the option to pursue federal funding for assistance with on-farm efficiency, which the County could help publicize.

5.3 MANDATORY MEASURES

One of the most effective conservation measures is the implementation and enforcement of mandates for conservation. It is important for the County to consider water conserving measures through revision of

the County Subdivision Code, adoption of ordinances, and lobbying for regulatory change at the state level to promote conservation. Although the County has some measures in place that would help promote conservation, the development process and Subdivision Code could be amended to do more. Since the County is part of the governing structure of the ABCWUA, it is important that the County adopt all applicable ordinances in order to create uniformity in the County. There are other ordinances that the County should consider even if not yet adopted by the ABCWUA. In addition, there are measures that State government should take in order to promote water conservation. (See Appendix L for a review of the overlapping jurisdictions that play a role in Bernalillo County).

To provide consistency, ease, and public understanding, Bernalillo County should adopt ABCWUA ordinances adapted for the County. This consistency would facilitate coordination between the City of Albuquerque and Bernalillo County and provide uniform mandatory conservation measures county-wide. Agricultural exemption standards should be included for County residents. Some ordinances that are not as applicable to the unincorporated portion of the County may be considered in the long term. Some ordinances have not yet been adopted by the ABCWUA, but are important enough that the County should consider adopting them on its own (such as Retrofit on Resale) and then encouraging ABCWUA to do the same. The following ordinances, at a minimum, should be adopted:

- Time of day watering (restrictions on when irrigation can occur to minimize evapotranspiration)
- Water waste (no fugitive water; no watering impervious surfaces; limit runoff; impose fines). Although this ordinance technically applies to the entire service area, including parts of unincorporated County, for legal purposes it should be adopted and adapted as necessary, by the County. One adaptation for the County is to require a fourth time water waste violator who does not have a meter to install one, and report use to the OSE.
- Planting restrictions (new development, aside from golf courses, parks and athletic fields, already covered by Water Budgets, are only allowed to use medium- and low-water use plants. Limitations on high-water use landscaping for City housing allow only 20 percent of landscape, with a maximum of 3,000 square feet; if property is only 300 square feet, entire property may have high water use landscaping). The County should include this measure for single family residential (see Implementation Plan for more details on administration) because most development in the unincorporated areas of the County is taking place in the form of single family residential (Bernalillo County Building, Planning and Zoning, 2005). The place to limit high-water use plants and affect conservation requires that the mandatory measure apply to all equally. This would apply only to lots that are creating landscaping.
- Design regulations for conservation (governs efficient use of water, harvested water and limits on water features for new development, renovation of City facilities and all golf courses) can be applied to County facilities and golf courses in unincorporated area and new development.
- Irrigation system standards (irrigation efficiency applies to existing golf courses, athletic fields, and golf courses, and new development except for single family residential)
- Water budgets applies restrictions to overall use of high-water use plants, amount of water used for city and non-city owned golf courses, and to all city owned parks and athletic fields. Should be applied in the same manner to Bernalillo County facilities.

5.4 MEASURES FOR RESIDENTIAL USERS

Bernalillo County should review recommendations recently developed by the Water Conservation Task Force for adoption:

- Retrofit on re-sale or re-model: although fixtures such as toilets are required to be in compliance with the Uniform Plumbing Code standard of 1.6 gallons per flush when a bathroom is remodeled, the County can require a more stringent set of standards, equally applicable to re-modeling or upon sale of a home, ranging from requiring water-conserving dishwashers to water-conserving washing machines. Retrofit on re-sale or re-model will increase the number of homes converting to low-flow fixtures. The retrofit will be the responsibility of the seller/homeowner.

5.5 MEASURES FOR NEW DEVELOPMENT

In order to limit the number of domestic wells drilled for individual lots, there are a range of options. If no utility is available for new development, measures can be taken to require future developments to use less water by limiting the amount of water to be drawn from domestic wells.

Since applicants for building permits have to identify their water source, and will not be issued a Certificate of Occupancy until approved by the County (either sufficient water from a utility or a well), the County can require a meter for multi-family wells. Although there is concern and opposition to the metering of domestic wells, meters would increase understanding of water use patterns. In addition, metering of consumption has been demonstrated to decrease use due to awareness of volume used. If meters are not required for all new domestic wells, they could be or randomly required, for example on one out of every eight wells installed or promoted on a voluntary basis. Meters for new domestic wells should be uniform, with the ability to be read from a distance. If legal authorization is granted, Bernalillo County can collect the well information annually, using existing Public Works employees.

Given the projection of increased water use, the County could adopt a “zero footprint” requirement, whereby new development would be required to assist with the conservation program, either through monetary contributions or by retrofitting existing high-use devices in the community. This would minimize the increased water use in the County, protect existing residential use, and allow for economic activity. Other programs reviewed have spent several years addressing the issue of water conservation and new development. Some have been successful in imposing restrictions, conservation standards, or in creating a “zero footprint” in the community. The actions could also be done through setting standards for water smart homes, so that consumers would have the opportunity to choose what level of conservation will be included in the home as it is built.

There is a wide range of approaches to new development. The City of Albuquerque recently amended its subdivision code (Section 4401) to require developers to install one of three conservation devices^{xv}. So far, this approach seems to be working well for commercial homebuilders^{xvi} in Albuquerque. On the high end of potential requirements, a community in California required developers to pay \$5,000 for every new single family home or apartment unit built. The money is then used for conservation programs to offset the increased water demand. The City of Santa Fe (and other cities) was successful in requiring developers to install low-flow toilets in order to offset new water demand. Through this program developers retrofitted many toilets in the public schools and restaurants where use is very high and consequently the most savings can be found.

The County Code for Subdivisions language could be changed from “should” to “shall” in Section 74-91, *Design Requirements for water management*, item 2, “Low water use landscaping techniques applying the principles of xeriscaping should be utilized.” Currently County Code for major subdivisions requires a new home to demonstrate 70 years of water availability, the proof of which varies according to the number of lots being developed (major or minor subdivision).

Bernalillo County staff should also review the County development review process for other conservation opportunities and potentially incorporate those in a new conservation ordinance.

5.6 MEASURES FOR EXISTING COMMERCIAL, INDUSTRIAL OR INSTITUTIONAL WATER USERS

The following measures can be considered for adoption to encourage conservation among existing commercial, industrial, or institutional water users.

- Require commercial, industrial and institutional entities to change to low-flow fixtures (toilets, faucets and showers) by a certain date. Allow the institutional entities more time than the commercial or industrial sites.
- Require retrofit by commercial facilities to low-flow fixtures (toilets, faucet aerators, urinals, showerheads) by a certain date.
- Adopt other ABCWUA ordinances for uniform mandatory measures County-wide, such as
 - Large water users ordinance
 - Car wash restrictions
 - Hospitality Industry
 - Water and sewer rate structure for conservation surcharge for water accounts in small utilities and water budgets for landscape only accounts.

6. COMMUNICATION PLAN

Based on public perception and best management practices, the County devised a Communications Plan to assist with education and outreach to County residents on water conservation. (See Appendix D for the full Communications Plan). Bernalillo County should conduct a mass media education/information campaign to all areas with messages regarding the finite nature of aquifer supplies. A sense of urgency will be necessary to galvanize the public interest. All conservation messages will have a two-fold message: (1) Water conservation is essential to our well-being and (2) Here is how we can do it.

6.1 COUNTY-WIDE EDUCATIONAL CAMPAIGN

A major radio, television, and print campaign, coordinated with the ABCWUA, should be launched to provide the “context” for an unprecedented County-wide educational and informational initiative. This approach, although not as cost-effective as a targeted campaign, is essential because fully 37 percent of audiences use wells, and there is no direct conduit to them. This mass media approach will serve as an urgent “context” for all County residents to understand the importance of water conservation, and to increase their participation.

Bernalillo County must work closely with the large and small water utilities that serve 63 percent of the targeted population. Effectively, these entities are the conduit that will enable the County to deliver conservation messages to their customers. Through them the County will disseminate bill inserts, brochures, and other “how-to” communication materials. Use of the utilities is a critically important element, as they will enable the County to target County residents directly. Bernalillo County staff should seek meetings with representatives of these utilities to discuss joint activities such as workshops and conservation demonstrations addressing the interests of utility customers. Bernalillo County can

provide these utilities with pre-printed educational and informational bill inserts and other “how-to” materials.

The following key messages are recommended for the educational campaign:

- The surface water and ground water basins (aquifers) that serve the County have a finite supply of water.
- The ground water is being mined (pumped out) at a rate faster than it is being replenished.
- Continued prosperity in this region requires that our water supplies be managed with great care.
- Bernalillo County calls upon all residents to conserve as much as possible.
- Bernalillo County will do everything in its power to assist residents in achieving this goal.
- Bernalillo County is embarking on a comprehensive educational and informational conservation program aimed at helping residents save water.

For the County-wide program, the goal should be twofold: lowered GPCD, and lowered volume usage. Baseline data should be developed to enable the County to assess progress toward the goal in the immediate years ahead. When County residents reach goal, the achievement should be publicized and celebrated.

As broad public awareness activities are unfolding, a tailored communication plan should be launched in each of the study areas via localized print materials and outreach activities. (See Appendix D, the Communication Plan, for details). Bernalillo County can conduct conservation education outreach in each of the study areas at community events.

The program will consist of educational activities such as seminars and workshops, teaching residents how to minimize water use via high-efficiency appliances, low-water-use landscaping, water harvesting, reuse techniques, optimum well maintenance, and agricultural conservation. In addition, materials will be developed or adapted and provided to schools for more wide-spread education.

6.2 EDUCATIONAL PROGRAM FOR AGRICULTURAL CONSERVATION

Bernalillo County can support agricultural users in using their water most efficiently. The Bureau of Reclamation (BOR) has educational and grant programs to support agricultural conservation. Bernalillo County staff can work closely with the BOR to provide more information, as well as funding, on practices that conserve water. The areas to consider were included as goals in the Middle Rio Grande Regional water plan, such as laser-leveling of fields and upgrading agricultural conveyance systems. However, the difficulty in conserving in agriculture is the disincentive to conserve created by the legal requirements for putting water rights to beneficial use.

7. METHODS TO MEASURE EFFECTIVENESS OF THE CONSERVATION PROGRAM

7.1

7.2 VALUE DRIVER ANALYSIS

As an input to the Water Conservation Plan, the County went through a process of evaluating the various recommendations in the Plan for the value to the water conservation program versus the difficulty of

implementation. The values were as follows: Effectiveness, broad equitable participation, political will/buy-in, knowledge and understanding (data availability is a sub-set), and regional synergy. Further details on the process can be found in Appendix M.

Surveys and periodic public meetings can be carried out to assess changes in public perception and practices as the conservation program is implemented. The following measures to assess the success of a Bernalillo County water conservation program are outlined according to the values derived above:

- Effectiveness/change in behavior, as shown in the following three measures:
 - GPCD
 - Volume of water used by utilities
 - Volume of water estimated to be used by domestic well users
- Knowledge and understanding
 - Data Availability
 - Level of metering
 - Level of reporting to OSE on those with domestic well meters
- Broad, equitable participation
- Political will/buy-in
 - Conservation-related ordinances passed
- Regional Synergy
 - Regional initiatives for conservation in which the County participates (i.e. lobby PRC on rates, work with other Counties for development standards for conservation)

In addition, the following will be applied to the recommendations in order to measure effectiveness:

- Early wins (1 year or less)
- Low hanging fruit (easy to do)
- 80/20 rule: with 20 percent effort reap 80 percent of the benefit
- Synergy development with other entities
- All others

8. IMPLEMENTATION PLAN

There is a variety of approaches to water conservation. Bernalillo County can look at a combination of program actions, voluntary measures, and mandatory measures. One option is to introduce voluntary measures initially, as a way of encouraging residents and businesses to conserve voluntarily, and as a way of educating County residents on how to conserve. Voluntary measures would include education, incentives and recognition programs. Voluntary measures can be combined with mandatory measures over time. Some mandatory measures can be introduced early on, depending on the probability of success and the ability to enforce the measures. More mandatory measures may be introduced later in the program, as residents and businesses come to understand how to conserve, and to increase the amount of actual conservation. An additional consideration is for the County to evaluate whether a measure provides permanent savings (as in changing out a toilet) versus other measures that may or may not

provide permanent savings (such as education). Outlined in this section are a variety of approaches to conservation measures.

Implementation of the Plan comprises the development of a water conservation program. A water conservation program will incorporate setting priorities, coordinating, securing funds, hiring or dedicating staff, and training staff. Implementation will be dependent upon many factors, such as time and resources required for a component, political factors, awareness level, and commitment of County staff. Public meeting participants indicated support for a Bernalillo County Water Conservation plan, as outlined in Theme 1, “water conservation is important.”

The first step for the program is to delegate existing staff and/or hire staff to implement the Water Conservation Plan. Secondly, the County staff should recommend priorities and goals for the program for adoption by the Bernalillo County Commission. Determining priorities and setting goals will require dialogue among County staff and consultation with stakeholders in the County (Stakeholder Advisory committee development and meeting with business interests in the community). Based on those priorities and goals, County staff can set tactics and strategies, find funds for the new program, develop educational materials, and develop mandatory measures.

8.1 METHODS

8.1.1 Bernalillo County as role model/Implement County facilities Plan

Bernalillo County commissioned a Water Conservation Plan in 2004 for its facilities, and is beginning to implement that plan. Bernalillo County acting as a role model in implementing the County Facilities Plan is an option that would not require new sources of funding. Bernalillo County can take a range of program actions, depending upon the current commitment to conservation by facilities’ maintenance staff and management. These actions would require educating staff on how to implement conservation measures. The ease of implementation will depend on current attitudes toward and understanding of conservation within the County. As outlined in Theme 6, “How can Bernalillo County help?” public meeting participants did not specifically request that the County act as a role model; however, the suspicion of government and preference for collaboration from the County would likely be mitigated by the County taking concrete steps to conserve water in its own facilities before asking County residents or businesses to conserve. Therefore, these easy to achieve measures (low hanging fruit) should be given high priority and would qualify as an early win.

Some of the steps that the County should take to demonstrate good stewardship of scarce water resources are outlined below.

1. Measure a baseline of current water use for County facilities. Establishing a baseline of water use for County parks and facilities would require staff time. **It** is important confirm that water is being saved by the new measures, and to measure the amount. This step requires staff time and development of the baseline information required.
2. Develop new irrigation schedules for minimizing evapotranspiration (ET). This step requires staff time and development of climate and seasonally appropriate irrigation schedules.
3. Implement water conservation as the default for Parks and Recreation and Facilities Maintenance staff. Examples include education of facilities’ maintenance staff to look at areas such as preventing and reporting leaks and waste, replacing sprinkler heads, and keeping grass slightly taller than typical to minimize ET. This requires staff time, expertise, evaluation of products (i.e. correct sprinkler heads for application), and adoption of policy on grass height. cos

4. Use conservation in County facilities as educational support by placing ads and other promotional materials to publicize County facilities with xeriscaping as demonstration sites. See **Communications Plan** for detail on implementation of publicity.

8.1.1.1 Implement Communications Plan - 80/20

Implementation of the Communications Plan is an important element of a Water Conservation Plan in order to educate County residents and businesses. The importance was indicated in several of the themes from the public participation meetings held at the outset of the water conservation planning process. Some of the themes that reiterate the need for a Communications Plan include Theme 1, “we know water conservation is important;” Theme 2, “exploring why water conservation is important;” Theme 4, “we need more education on conservation;” and Theme 7, “a diverse universe;” communicating with the wide range of water users, water sources, and geographic and demographic areas.

The ease of implementation and cost of the Communications Plan will depend up the element involved, but would have a big impact, thus qualifying for the 80/20 measurement in the method to measure effectiveness. Developing materials will be slightly more costly and more complicated, depending upon the graphics capability already at the disposal of the County. Developing workshops for residents will require staff effort and cooperation with other agencies for technical assistance (such as Natural Resources Conservation Service). However, the workshops will not require a great deal of funding. More expensive elements, such as radio and television, can be simplified through cooperation with other entities in the region. As such, they may fall into a longer range plan. Theme 8, “water quality” can be addressed by providing workshops and educational materials to domestic well users, including topics such as proper siting, maintenance, closure procedures, and decreased water use (by limiting water entering a septic system).

The Communications Plan can be carried out by staff, depending on internal resources and skills or by a public relations (PR) firm. The following are implementation steps for the Communication Plan:

1. Publicize County-wide conservation goals.
 - a. This step can be developed with either staff time or a PR firm, or a combination thereof.
 - b. Publicity would include press releases, published articles, ads in papers throughout the County, and printed materials such as brochures or newsletter
 - c. Potential venues include mass media, distribution of printed materials via utilities and community water systems, community events, or direct mail.
 - d. Press releases, articles, and development of printed materials would require staff time; ads and mass media would incur costs depending upon the outlet and complexity, and if a PR firm developed any of the above, that would add a cost in addition to the other media costs.
2. Publicize County Water Conservation plan. The summary of the Plan on the Bernalillo County website could be published with County staff time at no cost. Another option is to send a summary to all public meeting participants or to all County residents. The printing and mailing costs would depend upon the length of the summary.
3. Engage with County leadership on the Conservation plan and its message and implementation. This step is important for the success of a water conservation program, and would require County leadership and staff time.

4. Publicize incentive program. Implementation of this step will depend upon the incentives chosen and whether they are new programs or cooperative programs. As outlined in step 1 above, the costs would be dependent upon whether the publicity is implemented solely by the County, in conjunction with the ABCWUA, and/or with contracted assistance.
5. Publicize mandatory measures, including existing requirements for new development, and measures to promote conservation. Implementation of this step will depend up the measures chosen and whether they are new measures or measures designed for coordination with ABCWUA. As outlined in step 1 above, the costs would be dependent upon whether the publicity is implemented solely by the County, in conjunction with the ABCWUA, and/or with contracted assistance. There are a range of options with mandatory measures. The first step should be to publicize those measures already in place for the County that govern water use (i.e., Subdivision Code or a new water conservation ordinance). The next step should be to review the ordinances in place that relate to water conservation for the ABCWUA, adapt them for use by the County, and go through the process of review for potential adoption. Finally, reviewing example ordinances recommended in this Plan would require a greater amount of staff time. Any that are useful would go through the review process for potential adoption.
6. Develop a series of training programs in conjunction with the U.S. Department of Agriculture Natural Resources Conservation Service (NRCS) for County residents on how to conserve without spending a lot of money, climate-adapted landscaping, and optimal irrigation practices. This would primarily require staff time to work with NRCS on the workshops, find locations, and publicize the training programs. Publicity and schedule for the scheduled workshops could take place on the County website at no cost, in newspaper ads for a minor cost, or as direct mail to all County residents, which would be the most costly.
7. Develop a series of training programs to educate domestic well users (37 percent of unincorporated County) about operation, maximum efficiency for wells and long-term supply, protection of water quality, well maintenance, and estimated usage to help them target areas for conservation. This would primarily require staff time to find experts to conduct the training, locations, publicity for the training programs. Publicity and schedule for the workshops could take place on the County website at no cost, in newspaper ads for a minor cost, or as direct mail to all County residents, which would be the most costly.
8. Develop educational materials on the various ground water basins (aquifers) in the County, drought, San Juan Chama impact, and other items of interest to County residents. This would require staff time and funding for written materials on the subjects. See Communications Plan for estimated cost for various educational materials. Step 1 above outlines the range of potential options for developing educational materials.
9. Collaborate with agencies in the County for agricultural use conservation education workshops. Collaboration should include the MRGCD, NRCS, New Mexico State University, New Mexico Water Resources Research Institute, MRCOG, and the Cooperative Extension Service. This would primarily require staff time to work with entities on the workshops, find locations, and publicize the training programs. Publicity and schedule for the scheduled workshops could take place on the County website at no cost, in newspaper ads for a minor cost, or as direct mail to all County residents, which would be the most costly.

8.1.1.2 Implement ABCWUA ordinances

This is not an area that was specifically recognized in the public participation meetings. However, since Bernalillo County is already a legal part of the ABCWUA, it is critical that some of the mandatory

measures are identical across the board, creating synergy as outlined in the method to measure effectiveness. The components such as the fines, definitions, and time of day restrictions should be identical between the County and the ABCWUA in order not to cause confusion. It should be relatively easy to implement, depending upon the support of the County Commission, and not require funding. It will take staff resources to adapt the appropriate ordinances for County adoption, and time for review of the draft ordinances by the ABCWUA Board and the County Commission.

1. Implementation of Water Waste and Time of Day Watering restrictions. An important part of the water waste and time of day ordinances will be enforcement, which may differ between the County and the ABCWUA. For example, the County should consider requiring a meter for those who have four water waste violations: if the water waster already has a meter, then the normal fine would apply. Although the ordinances could be adopted using existing staff, it is likely that enforcement would incur a cost, whether for new equipment, training, overtime, or other items. The options related to enforcement of these ordinances are outlined below:
 - a. The County should negotiate with ABCWUA to determine whether County residents can use the existing hotline for reporting violations of the above two ordinances, or set up and staff a hotline.
 - b. Enforcement can be negotiated with ABCWUA through cost-sharing with existing ABCWUA employees, or the County can use existing County Public Works staff and train them for enforcement. Training with the ABCWUA water waste employees can be negotiated (through revision of the existing Joint Powers Agreement).
 - c. If the County uses its own staff for enforcement, then the County would have to adapt the vehicle(s), including the addition of equipment such as video cameras for documentation.
 - d. To issue fines for water waste or time of day violations for non-ABCWUA customers, the County could issue direct bills. Another option for issuing fines **is** to work with the three major utilities to have them levy fines for water waste violations via the water bills.
 - e. Implementation of limitations on high water use landscaping. The County Building, Planning and Zoning Department should inspect the landscaping **and issue a red tag if landscaping is not in compliance..**
 - f. Implement design regulations for conservation and apply to County facilities, golf courses, and new development in unincorporated area. Bernalillo County would need to review the design regulations.
 - g. Implement irrigation system standards for existing golf courses, athletic fields, golf courses, and new development (excepting single family residential). **Bernalillo** County would need to review the irrigation system standards.
 - h. Implement water budgets for County and private golf courses, and to all County- owned parks and athletic fields. **Bernalillo** County would need to review the water budgets.

8.1.1.3 Non-ABCWUA mandatory measures 80/20

In addition to the ordinances that create uniformity for the entire ABCWUA, there are certain mandatory measures that the County should consider, to address Theme 9, “we need to control new development.” This is an area that will likely be more difficult to implement, because it will require buy-in from stakeholders in the business community (developers) and preferably cooperation with other entities.

Some of the difficulty lies in breaking ground, which includes passing mandatory measures for water conservation that are not currently in place for the ABCWUA and achieving consensus for all involved in the process of developing and approving mandatory measures. One new mandatory measure to consider is an ordinance requiring retrofit on resale or remodel. Implementation will be made easier with the commitment and buy-in of the Bernalillo County Commission, a stakeholders advisory committee if one is formed by the County, and education for County residents and businesses on the benefits of the ordinance. Although the County cannot address population growth and new housing directly, some mandatory measures can be implemented to maximize conservation efficiency and to limit the number of new domestic wells drilled. This would have the additional benefit of addressing Theme 8, “water quality.” These measures may not be easy to implement, depending upon the support of the County Commission and the response of County stakeholders. These will not require new funding. It will take staff resources to adapt the appropriate ordinances for County adoption, and time for review of the draft ordinances by the ABCWUA Board and the Bernalillo County Commission.

- Implementation of an ordinance requiring retrofit on resale or remodel. For the remodel portion, the requirement for **low-flow** devices would be added to a permit required for plumbing retrofit. Retrofit upon resale could be added as a requirement for a title transfer **and** verified as part of an inspection. Both of these would be better done on a County-wide basis or a regional basis. Implementation would require staff time, and major effort to work with title companies. This resale portion of this ordinance would be more complicated because it’s an area where the County doesn’t have direct jurisdiction.

8.2 AUDIENCES

8.2.1 Outreach to small utilities

Smaller utilities provide an opportunity for the County to reach County residents and an opportunity to promote water conservation. Outreach to smaller utilities can take place in a number of ways. Through closer ties to smaller systems, the County can help improve standard practice by support and assistance. An added benefit is that the County can continue to acquire better information on the rate of water usage within the County, and the practices and preferences of County residents. Implementation will require County staff time to develop relationships with the small utilities and community water systems.

1. Bernalillo County should survey the small utilities and community water systems to describe existing conservation measures, training required to improve conservation, accounting methods, level of metering for individual accounts, rates, and other charges. Information on all of these areas will assist the systems and the County in addressing areas where conservation can take place or be improved.
2. Bernalillo County should develop relationships with the various systems and utilities to promote conservation and identify ways to reach residents that are non-ABCWUA utility customers. This can happen in two ways: by meeting with the managers of the utilities, and by promoting participation in **the New Mexico Rural Water Association (NMRWA)** by all utilities through an incentive program and a Bernalillo County “chapter” within the larger organization.
3. One option, based on the information gathered in the surveys, is for the County to review the systems used and work with the individual systems to improve information gathering, water accounting, and leak detection (for systems and for individual accounts).
4. Another option for improving information gathering is to choose a uniform software system for the smaller utilities in Bernalillo County (less than 1,000 connections) that would track water

rates and usage, perform reporting and billing, and promote its use among all of the small utilities within the County in order to improve water accounting and information gathering.

5. **Bernalillo** County can subsidize metering for all (non-ABCWUA) utility customers that are not metered, either through new program funds or by writing grants with the small systems for metering individual accounts.
6. **Bernalillo** County should design technical workshops with the assistance of the NMRWA and the Rural Community Assistance Corporation (RCAC) (one set geared for small utilities and the other for community water systems) to address the issues most relevant for the water system. The needs for the technical workshops can be determined through the survey mentioned above. Because these organizations regularly provide this type of training, the process would require adaption for Bernalillo County to provide uniformity **and** identify participants.

8.2.1.1 Implement residential measures

Theme 3, “we’re already conserving,” indicates that public meeting participants are, for the most part, aware of and practicing water conservation. However, there are certain areas where they are not engaged, such as water harvesting and xeriscaping. Incentives and voluntary measures are more complicated and costly to implement. These measures fall into the all others category, but are an important part of a conservation program, engaging the public and providing education in the tools needed to conserve water. Incentive programs will likely be a combination of new programs implemented only by the County and negotiating those programs that could be shared with the ABCWUA in some way. The incentive programs, in addition to either developing new programs and ways to administer them, will also require new sources of funding, which will take staff time and political will.

Replacement of toilets is emphasized because of its larger amount of savings for less cost to the County. Toilet rebates should be targeted at homes that are older than 1995 and not likely to have been improved. In Bernalillo County, there are approximately 28,000 homes that may need a retrofit (most likely built 1995 or before)^{xvii}. By 2008, approximately 1,000 homes in the South Valley will be eligible to connect to the ABCWUA for water service. These homes can be targeted for a free audit for water-saving changes and toilet rebates for water customers. There are a range of options for implementing toilet replacements in the County outlined below.

1. **Bernalillo** County could coordinate the rebate program with ABCWUA. **Bernalillo** County should negotiate the terms of the level of coordination of the rebate program. If feasible, the ABCWUA could process applications for **the** toilet and high-efficiency washing machine rebate programs, with a cost per rebate to be reimbursed by the County. For non-ABCWUA customers, the County will issue checks directly to the home or business applying for the rebate. In the long term, the County can negotiate with the other three large utilities to issue County-funded rebates via utility bills.
2. **Another** option for replacement of **high-flow** toilets with **low-flow** toilets, in lieu of or in addition to a toilet rebate program, **is to** conduct a toilet distribution with three distribution points, North, South, and East. The toilet distribution program would help low income County residents who otherwise might not retrofit given the financial barriers, including upfront investment required to participate in a rebate program. One option for a toilet giveaway is coordination with community groups to identify potential participants, i.e., County residents that are homeowners, whose homes were built prior to 1995, and who are elderly, infirm, or unable to afford the upfront cost of a toilet. The community groups would provide volunteer plumbers, while the County would provide the toilets. Another option is a one-day event at a public outdoor venue. The County would publicize the event and provide a given number of toilets for County

homeowners. Anybody who picked up a toilet would be required to bring the old toilets back two weeks later for demolition^{xviii}. If the toilet(s) are not returned, the County should bill the homeowner for the cost of the toilet(s).^{xix}

8.2.1.2 Implement commercial measures 80/20

The area of measures to help conserve water in new development and existing businesses is one that will require the County to work closely with stakeholders. Despite the difficulty, this area is important because it will achieve conservation and address County resident preferences indicated in Theme 9 from the public meetings. The range of options includes incentives and mandatory measures.

1. Implement requirements for new development to have a zero footprint might be more politically difficult, and should probably be developed in conjunction with the ABCWUA and the Homebuilders Association. There are a variety of directions for this, ranging from a monetary contribution to the conservation program to offset the impact of each new home, to outright purchase of low-flow toilets for retrofitting older toilets by commercial homebuilders. This would require a range of administration by the County.
2. Require conservation measures for homes over a certain size, starting at 2,500 square feet. Require more stringent conservation measures for homes over 3,000 square feet.
3. Establish a five-tier system for water smart homes, allowing commercial homebuilders to use it as a promotion, and then recognizing homebuilders for the number of water smart homes they sell. Factors to be included in the five-tier system include low-water use dishwashers, high-efficiency washing machines, high-quality toilet, (some of the low-end toilets do not flush properly or develop leaks quickly), rain water harvesting systems, **and** permaculture features in landscaping.
4. Promote grey water systems **in** the form of incentives or mandatory measures. If required of new development, the range could include all single family homes, or only those built by commercial homebuilders. Inspection to verify it in either case would be carried out by **Bernalillo** County Building, Planning and Zoning. If the program were an incentive, upon inspection and thus verification of installation of stub-outs for a grey water system, the County would issue a check to the homebuilder. If an actual grey water system were installed, a permit should be required so that **Bernalillo** County Building, Planning and Zoning can verify **that** the system is properly designed and installed to protect the water supply system and the health and safety standards in the new home.
5. For existing businesses, the County could put together a recognition program for businesses that take measures to save water. **Recognition** of the businesses could range from a **published** thank you on the County website, with the potential for creating a conservation page, a **published** thank you for the measures taken in a newsletter, decals that the business could place in their window, collaboration with Chamber of Commerce for recognition or even a formal recognition, dinner. In terms of requiring businesses and institutions to change out toilets by a certain date, **if** the change-out does not occur, the County could send a letter requesting the change, or potentially take stronger measures, since it would be required by ordinance, **or** perhaps assess a fine for every month that the change-out is past due.

9. FUNDING SOURCES

Four main sources of funding are available for the Bernalillo County Water Conservation Plan. These sources can be used to directly support County programs or to promote conservation for the utilities or

community water systems. One source is state funds that are in place to support water conservation throughout the State, such as money from the Legislature. State Legislature money can be obtained by asking a member of the Legislature to sponsor a bill containing funding for a conservation program. If obtained, the State would set up a grant agreement with the County. The benefit of Legislature funding is that there are no strings attached. The downside is that it is generally a one-time allocation, and future funding would have to be requested annually, with no guarantee of passing. Currently the Water Trust Board, another potential source of state funding, does not fund outreach activities.

A second source is the typical budget requests from existing Bernalillo County sources, primarily the environmental gross receipts tax. There is often fierce competition for this funding source, and the funding may be difficult to allocate on a recurring basis, thus requiring the program to request the funding each year, with no guarantee of having the program funded. The County, via the ABCWUA, could attempt to obtain funding via a General Obligation Bond, which has low interest rates and a 20-year payback. The disadvantage is that the County would have to pay interest on a program that does not yield monetary benefits. In addition, it is difficult to get a General Obligation Bond passed, as voters are often reluctant to add to the property tax burden.

A third source is Federal grants through the U.S. Environmental Protection Agency (EPA) or BOR. The BOR 2025 Program and the Field Services Water Conservation Program have water conservation grants. There is fierce competition for the Field Services Water Conservation Program, which has been steadily decreasing the overall allocation from BOR. The EPA administers a Section 319 grant program through the New Mexico Environment Department, for watershed protection, so the program may not qualify.

A fourth source is fines levied on water waste violations that can be used to contribute to the budget for a conservation program. This is unlikely to be a significant source of funds, so cannot be counted on as a primary source of funding.

10. METHODOLOGY FOR ECONOMIC INCENTIVES AND MANDATORY MEASURES

The methodology to evaluate economic incentives and mandatory measures included the following approaches:

- Identification of significant programs within and outside of New Mexico
- Collection and review of policies, programs, outcomes, issues, and reports from a wide variety of water conservation programs
- Interviews of key individuals about the success of their programs to discuss what worked and what didn't, the processes they used, how they measured effectiveness, the target audience for the program, and any other information available.
- Review of information and documents online.

After all of the information was reviewed, the programs and policies were reviewed for applicability for the County. Based on the review, some of the approaches are recommended for County consideration, and are outlined in the preceding pages.

The following programs and/or entities were reviewed:

1. California Urban Water Conservation Council

2. City of San Antonio, Texas
3. City of Austin, Texas
4. City of San Marcos, Texas
5. Houston-Bay Area Subsidence District
6. Carol Baker, Lobbyist
7. Texas Water Development Board
8. City of Denver, Colorado
9. City of Boulder, Colorado
10. City of Aurora, Colorado
11. City of Durango, Colorado
12. City of Seattle, Washington
13. City of Portland, Oregon
14. Southern Nevada Water Authority
15. City of San Diego, California
16. City of Oakland, California
17. City of Los Angeles, California
18. City of Phoenix, Arizona
19. City of Tucson, Arizona
20. City of Gilbert, Arizona
21. City of Mesa, Arizona
22. State of Arizona Water Resources Department
23. State of New Mexico, State Engineer's Office
24. Bernalillo County
25. City of Albuquerque
26. Albuquerque Bernalillo County Water Utility Authority
27. State of Washington
28. State of Colorado
29. State of Utah
30. City of Atlanta
31. National Association of Counties
32. New Mexico Rural Water Association
33. Rural Community Assistance Corporation
34. Bernalillo County Cooperative Extension Service
35. City of Cabria, California
36. Chris Brown, independent consultant, San Antonio, Texas

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ⁱ WRB is made up of Bernalillo, Sandoval, Tarrant, and Valencia Counties and the municipalities contained therein.

ⁱⁱ The agriculture areas in the East Mountains using acequias were not considered as part of this study.

ⁱⁱⁱ MRGCD water is a property right associated with the land ownership, and those properties with MRGCD rights pay an annual tax to MRGCD.

^{iv} The income group ranges were developed in the Water Use Study as a roughly even distribution of ranges of income by household

^v Based on a review of a random sampling of water rights permits in the OSE files as part of the water use study, the consultants estimate that less than 25 percent of all permittees are required to meter their wells and report the use data - these are primarily multi-user or multi-uses wells. However, only about 10 percent of those required to

report (or 2 percent of the total permittees) actually report their usage; and the OSE is not adequately staffed to pursue a higher level of reporting compliance.

- ^{vi} Defined as water that is consumed but not measured or billed properly, such as through meter inaccuracy or abnormalities that allow water consumption that is not measured
- ^{vii} Apparent and real losses are defined by the American Water Works Association.
- ^{viii} The number of County residents that participated in public meetings was small compared to the population. Therefore, the attitudes, practices and preferences of all those who did not attend is relatively unknown. Surveys on water resource topics over the last five years, however, indicate that a majority of people living in this region are supportive of, and practicing conservation. See the report on public meetings in Appendix H for summaries of those surveys.
- ^{ix} In a study performed by the California Urban Water Conservation Council of the cost effectiveness of their Best Management Practices, landscape/irrigation audits and irrigation budgets were the only BMP's that were cost effective every year in every region of the state, regardless of customer make-up, drought conditions, or cost of supplying water.
- ^x Some options include providing incentives to mobile home parks for putting in submeters to mandating submetering. ABCWUA has considered an ordinance to submeter all new apartment buildings and mobile home parks.
- ^{xi} This measure could also be achieved by incentives or a mandate.
- ^{xii} Estimation by the City of Santa Fe in 2003.
- ^{xiii} Based on \$125 cost per toilet. In addition, the one-time acquisition cost for the amount of water saved, at \$5,000 per acre foot to purchase water saved, is \$3.5 million. Since the benefits of toilet replacement continue over time, and water costs will only increase, there is a significant positive cost-benefit ratio for a toilet replacement program.
- ^{xiv} The program was originally intended for residential users only, but was expanded to include businesses when the residential market did not absorb all the toilets the City purchased in the short time provided.
- ^{xv} 1) Hot water recirculating systems 2) Two out of the following three items: Efficient dishwasher, washing machine or dual flush toilets 3) Cooling system that is not evaporative cooling.
- ^{xvi} Used to designate those entities that are building homes other than for their themselves.
- ^{xvii} 1995 was the year that 1.6 gallons per flush toilets became commonplace in new homes, although the change to the Uniform Plumbing Code took place in 1990.
- ^{xviii} Both Albuquerque and Rio Rancho set up programs for destruction and re-use of the old toilets for aggregate for road construction.
- ^{xix} Any proceeds would be folded back into fund the water conservation program.